

TWO NEW NORTH AMERICAN SPECIES OF
HYDROVATUS, WITH NOTES ON OTHER SPECIES
(COLEOPTERA: DYTISCIDAE)¹

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The North American species of *Hydrovatus* still present some of the most perplexing problems found among the water beetles. The western United States and Mexican species are particularly poorly known, and considerable work is needed before a satisfactory taxonomic treatment of the Nearctic fauna can be completed. Even in the eastern United States, several problems remain and new species may be found as characteristics for their separation are discovered.

The two new species described below were first recognized in mass collections from Payne Prairie south of Gainesville, Florida. Once their distinctiveness was realized other specimens were found either mixed with other species in the collection or in unsorted material. The series from Payne Prairie were sorted out from among approximately 5,000 specimens of other species of *Hydrovatus*.

After examining and dissecting specimens of the Palearctic *H. cuspidatus* Kunze in the British Museum (Natural History), I am convinced that I was completely in error in referring the Nearctic *pustulatus* Melsheimer and *compressus* Sharp to this species. *H. cuspidatus* and *clypealis* Sharp, although superficially similar to *pustulatus* differ in several important respects. Both, for example, have a ridge with cross striations on the anterior border of the hind coxae which probably functions as a stridulatory organ, and in both species the male genitalia are of an entirely different type from any of the American species. The parameres are complex, in *cuspidatus* (fig. 1) there is a distinct hook at the apex and in *clypealis* chitinous pieces curve in at the tip and membranous lobes project irregularly. The shape of the aedeagus is distinctive in both species.

In consequence, the American forms need to be reassigned as follows: *Hydrovatus pustulatus pustulatus* Melsheimer (fig. 10), new combination to replace *H. cuspidatus pustulatus* Melsh. (Young, 1956) and *H. pustulatus compressus* Sharp (fig. 9), new combination to replace *H. cuspidatus compressus* Sharp (Young, 1956).

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The relationship between *pustulatus* and *compressus* is still not completely determined, but the two apparently represent the extremes of a single species which varies geographically. Typical *pustulatus* decreases in size from north to south and possibly also to the east in North and South Carolina and Georgia. The largest specimens I have seen are from Wisconsin, Michigan, New York, Illinois, and Indiana. Specimens from Virginia, Tennessee, Arkansas, and northern Louisiana are smaller although very similar in other respects. Specimens from Cherokee County, Alabama; Mitchell, Lanier, Baker, and Decatur counties, Georgia; Houston County, Alabama; and Calhoun, Jackson, and Walton counties, Florida, apparently represent intergrades between typical *pustulatus* and the smaller, darker *compressus*. The latter apparently replaces *pustulatus* in the Atlantic and Gulf Coastal plain from Louisiana to North Carolina, although occasional specimens occur which have when teneral elytral markings of the type of *pustulatus*.

The male genitalia (fig. 3)² of the single type of *compressus* (in BMNH) is as far as I can see identical with those of *pustulatus* (fig. 2) and with those of numerous specimens examined from throughout the range. Specimens from southern Florida tend to be smaller and somewhat more coarsely punctate than the type of *compressus*, but in other respects agree with it perfectly. Specimens from North Carolina (Brunswick Co., Near Bishop, vii.25.1959, F.N. Young in University of Michigan Museum of Zoology) and South Carolina (Beaufort Co., Cambahee River marsh, vii.25.1959, F.N. Young in UMMZ) although variable are also very similar to the type of *compressus*. I have also seen a single female from the Bahamas (San Salvador Island, near Cockburn Town, iii.18.1953, E. B. Hayden in American Museum of Natural History) which probably also represents *compressus*.

***Hydrovatus inexpectatus* new species**

DIAGNOSIS: A small, pale *Hydrovatus* (fig. 4) similar in shape to the Brazilian *crassulus* Sharp (fig. 6), but differing from that species in the smaller size (1.89-2.15 mm in length) and the different structure of the clypeus. Body form less convex than any of the American species and with the sides of the elytra converging so gradually that they appear almost parallel-sided when viewed from above. Male

²The genitalia of the type were unfortunately lost after the above figures were drawn. A specimen from Florida with genitalia intact and previously compared with those of the type has been deposited in the BMNH.

aedeagus unique (fig. 5) among the American species (male of *crassulus* unknown to me), the broadened tip suggesting some of the Old World species.

HOLOTYPE MALE: *Body form* irregularly elongate oval, the sides of the elytra when viewed from above less strongly arched than in most species and thus giving the appearance of being parallel-sided in the middle portion, gently converging posteriorly until the sides curve sharply in and then recurve to form the acuminate tip; in profile, body arched dorsally but somewhat flattened on pronotum; ventral profile less arched than usual, almost flat. Total length, 1.98 mm; greatest width, 1.29 mm; width at base of pronotum, 1.20 mm; width at apex of pronotum, 0.82 mm; length of pronotum at midline, 0.43 mm; length from base of prosternal process to apex of coxal lamina, 0.86 mm; width between eyes, 0.52 mm. *Head* distinctly microreticulate, the meshes impressed so that surface is only feebly shiny; meshes finer on clypeus than on front and vertex; punctation fine, sparse, and irregularly distributed; clypeus with distinct margin, the margin irregular and somewhat thickened at middle but not noticeably truncate and not sharply raised in middle (not as described for ♂ of *crassulus*, Zimmermann 1921: 191); antennal tubercles, feeble clypeal tubercles, and punctate clypeo-frontal grooves much as in *pustulatus* and other species, but clypeal tubercles somewhat more distinct; usual rows of punctures near eyes difficult to see because of the impressed microsculpture; arms of tentorium (?) vaguely visible through the thin integument running from antennal bases to converge on the front. *Pronotum* with impressed microreticulations much as on vertex of head; usual transverse anterior row of punctures and discal punctures coarser than punctures on head, the latter somewhat irregularly distributed but denser than on head; sides distinctly margined, the margins nearly straight with anterior angle acute; angle of pronotal margin with elytra when viewed from the side very obtuse. *Elytra* with impressed microreticulation as on head and pronotum but the meshes coarser and more regularly hexagonal; punctation coarse, deep, rather regularly distributed; punctures coarser than on pronotum, separated by from two to four times the diameter of a single puncture; intermediate series of punctures indistinguishable from others; elytral margins distinct, curved in profile, not visible from directly above; no distinct sulci on sides of elytra; tip moderately acute, somewhat deflexed. *Venter:* Prosternal process broadly triangular, the tip cephalad forming a minute ventral hook; disk of process microreticulate, the lateral (hind) angles irregularly minutely tuberculate; lateral

borders indistinct. Hind coxae coarsely microreticulate and with large punctures separated by from one to two times the diameter of a single puncture. Abdominal sternites microreticulate, the meshes irregular and not deeply impressed; first visible sternite coarsely but shallowly and irregularly punctate; fused 2nd and 3rd sternites with a few coarse but shallow and scattered punctures on 2nd; last visible sternite pointed behind, the point deflexed. Anterior and middle tarsi moderately expanded; middle tibiae with a few large setigerous punctures on anterior face; antennae not evidently modified, not noticeably thicker than in female. *Coloration*: Head and pronotum light reddish yellow. Elytra darker, light reddish brown except along suture and sub-basal and postmedian fascia or spots which are lighter (lighter markings more evident in other specimens in series.) Venter light reddish yellow including legs and antennae. Male genitalia with parameres of usual type for American species but aedeagus distinctive (fig. 5) in lateral aspect acuminate to tip and feebly recurved; in ventral aspect broadened toward tip and spatulate.

ALLOTYPE FEMALE: Very similar to holotype; sex apparently determinable only by dissection. Clypeus not detectably different from that of male except that the clypeal tubercles are reduced. Microsculpture and punctuation very similar to holotype. Color somewhat lighter on all parts. Total length 1.98 mm; greatest width, 1.20 mm; width at base of pronotum, 1.02 mm; width at apex of pronotum, 0.82 mm; length of pronotum at midline, 0.43 mm; length from base of prosternal process to apex of coxal lamina, 0.86 mm; width between eyes, 0.52 mm.

VARIATION: The paratype series varies somewhat in color — some specimens being slightly darker, particularly on the elytra, and some have light markings more distinct. The types may be slightly teneral.

TYPE LOCALITY: Holotype and allotype: FLORIDA: Alachua County, Payne Prairie south of Gainesville, vii.23.1960, F. N. Young (in UMMZ). Paratypes: 1 ♂ same data (U. S. National Museum); 1 ♂ same data (Museum of Comparative Zoology); 1 ♀ same locality, viii.21.1961 (California Academy of Science); 1 ♀ same locality, viii.21.1961 (BMNH); 1 ♀ same locality, viii.22.1961 (American Museum of Natural History); 2 ♀ FLORIDA: Dade County, Miami, ix.13.1960, blacklight trap, P. E. Briggs (Florida State Collection).

***Hydrovatus platycornis* new species**

DIAGNOSIS: A medium sized, dark colored, and immaculate *Hydrovatus* (fig. 12) similar to the Mexican *concolor* Sharp (fig. 13) but

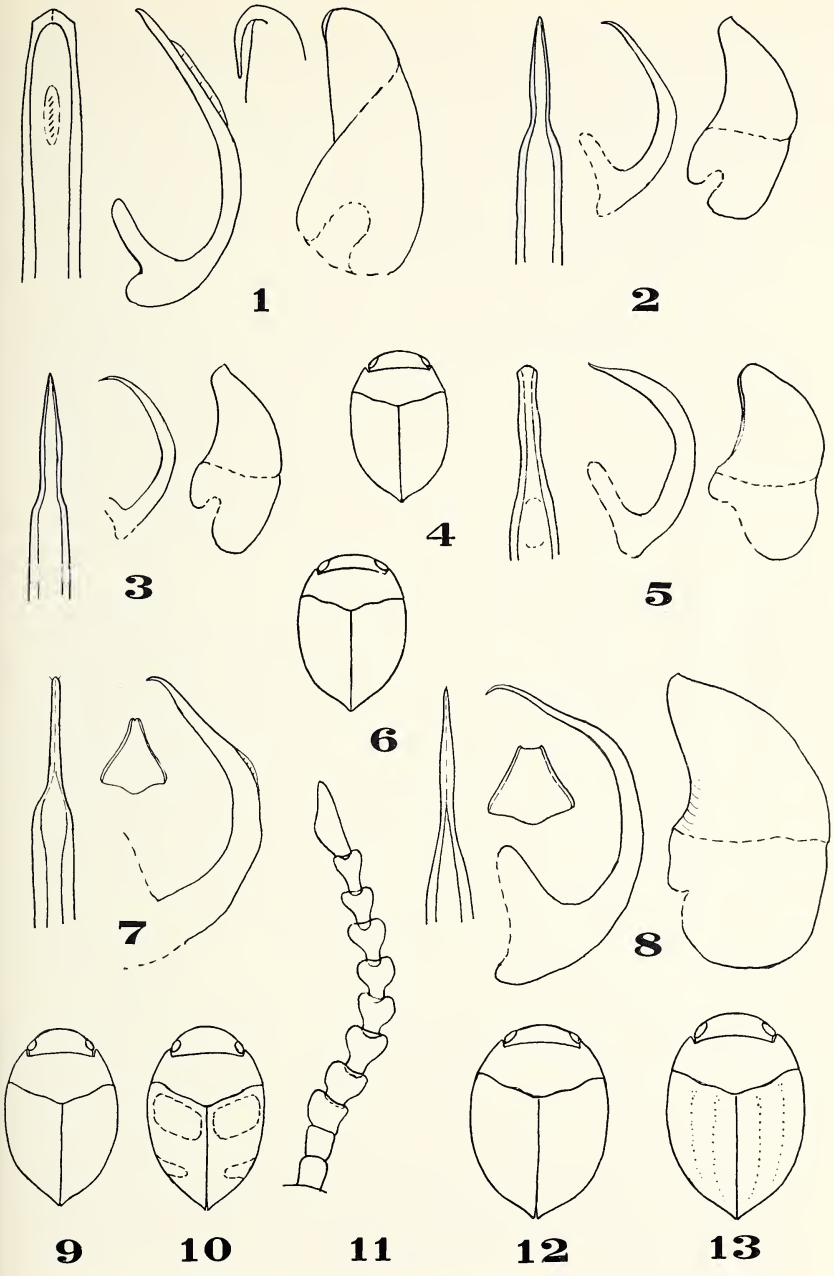
differing from all the known American species in the flattened and widened intermediate antennal segments in the male (fig. 11). Larger and less attenuate behind than *pustulatus compressus* Sharp with which it has usually been found associated; smaller, more attenuate behind, and more finely punctate than *peninsularis* Young with which it was also associated. Male genitalia of same general type as in *pustulatus* but differing in shape of aedeagus and parameres. Although the antennal modification suggests some of the African species, the genitalia and other characters indicate relationship with the American group.

HOLOTYPE MALE: *Body form* broadly oval, less strongly attenuate behind than *concolor*; broadest at about basal third of elytra; dorsal profile convex, regularly curved; ventral profile not strongly arched;

EXPLANATION OF PLATE 19

(Scale: 1 mm = approximately 10 mm on figure at $\times 10$;
approximately 34 mm at $\times 40$; approximately 46 mm at $\times 60$.)

1. *Hydrovatus cuspidatus* Kunz., Corsica: Bastia, E. Reveliere (Sharp coll., BMNH). L-R. Ventral view of male aedeagus $\times 60$; lateral view aedeagus $\times 60$; inner face left paramere $\times 60$; outer face right paramere $\times 60$.
 2. *H. pustulatus pustulatus* Melsh. Indiana: Monroe Co., Bloomington, x.20.1952, J. R. Munsee (UMMZ). L-R. Ventral view of male aedeagus $\times 60$; lateral view of aedeagus $\times 40$; outer face right paramere $\times 40$.
 3. *H. pustulatus compressus* Sharp. Louisiana: New Orleans (male type in BMNH). Same as 2
 4. *H. inexpectatus* new species. Dorsal outline of holotype (UMMZ) $\times 10$.
 5. *H. inexpectatus* new species. Holotype (UMMZ). As in 2 and 3.
 6. *H. crassulus* Sharp. Brazil. Dorsal outline of female cotype (BMNH) $\times 10$.
 7. *H. concolor* Sharp. Mexico: Mexico City, Höge. Male cotype (BMNH). L-R. Ventral view of aedeagus $\times 60$; prosternal process $\times 40$; lateral view of aedeagus $\times 60$.
 8. *H. platycornis* new species. Holotype male (UMMZ). L-R. Ventral view of aedeagus $\times 60$; prosternal process $\times 40$; lateral view of aedeagus $\times 60$; right paramere $\times 60$.
 9. *H. pustulatus compressus* Sharp. Dorsal outline of male type (BMNH) $\times 10$.
 10. *H. pustulatus pustulatus* Melsh. Dorsal outline of male (same as fig. 2) $\times 10$.
 11. *H. platycornis* new species. Right antenna of holotype $\times 60$.
 12. *H. platycornis* new species. Dorsal outline of holotype $\times 10$.
 13. *H. concolor* Sharp. Same data as fig. 7. Holotype male (BMNH) $\times 10$.
- Note: The male genitalia of Dytiscidae are retracted into the body on the side. In copulation they are extruded outward, rotated, and projected forward and downward. The parts in the above figures are designated in relation to the copulatory position. Dashed or cross-barred areas are easily distorted membranous portions or portions broken in dissection. The dashed line across the parameres represents the base of the sheath into which the genitalia are withdrawn into the body.



YOUNG — HYDROVATUS

more strongly convex in dorsal profile, less strongly convex in ventral profile than *peninsularis*, much as in *pustulatus*. Total length, 2.49 mm; greatest width, 1.80 mm; width at base of pronotum, 1.60 mm; width at apex of pronotum, 1.02 mm; length from base of prosternal process to apex of coxal lamina, 1.10 mm; width between eyes, 0.69 mm. *Head* microreticulate much as described in *inexpectatus* but meshes somewhat less impressed, the surface appearing more shiny; clypeal tubercles reduced; clypeo-frontal grooves more closely and heavily punctate; punctures along inner margins of eye difficult to see, apparently not setigerous; clypeal margin distinct, feebly truncate at middle, and bordered behind by an indefinite groove; punctation fine, sparse, and irregularly distributed. *Pronotum* microreticulation coarser and more deeply impressed than on head but surface moderately shiny; punctation on disk coarse and dense compared with that on head, rather uniformly distributed but irregularly spaced; anterior row of coarse punctures not readily distinguished from discal punctation; punctation finer toward margins; sides distinctly margined, gently curved, anterior angles moderately acute; angle of pronotal margin with elytral obtuse but less so than in *inexpectatus*, about as in *pustulatus*. *Elytra* microreticulate about as on pronotum, meshes not deeply impressed, the surface moderately shiny; punctures coarser than on pronotum, more regular in size, and having a tendency to form irregular rows although not nearly as coarse nor with intermediate series of punctures forming such distinct rows as in *concolor*; humeri moderate, a feeble, punctate groove behind them above a feeble ridge; both groove and ridge more evident than in *pustulatus* but much less evident than in *concolor*. *Venter*: Prosternal process triangular with anterior end truncate; distinctly but narrowly margined at sides; disk punctate with inconspicuous microreticulations. Hind coxae and coxal lamina with very coarse, dense punctation, the punctures separated by less than the diameter of a single puncture and sometimes confluent; interspaces with irregular rugose sculpture but moderately shiny. First visible abdominal sternite and 2nd (fused with 3rd) with coarse punctures much as on coxae; interspaces with rugose sculpture representing the coarse, deeply impressed meshes of the microreticulation evident on other abdominal sternites; meshes of abdominal microreticulation elongate; last visible sternite acuminate behind, the tip deflexed. Anterior and middle tarsi moderately expanded, slightly more so than in female. Middle tibiae rather coarsely and densely punctate on anterior face, the punctures setigerous and irregular in shape. Antennae (fig. 11) with 3rd through 6th segments conspicu-

ously broad and flat; the 7th and 8th broader and flatter than usual; the 11th modified, laterally excised. *Coloration*: Head and pronotum brownish yellow, pronotum somewhat darker on disk than at sides; elytra dark brown, lighter on lateral margins particularly toward apices, but without indication of any maculation. Venter and appendages nearly uniformly brownish yellow. *Male Genitalia* (fig. 8): Parameres of general type of *pustulatus*; tips less rounded than in *concolor* (fig. 7). Aedeagus flexulose at tip, finer and less abruptly narrowed than in *concolor*.

ALLOTYPE FEMALE: Similar to male except for unmodified antennae; sex doubtfully determinable by the narrower anterior and middle tarsi. Microsculpture and punctation very similar. Coloration throughout slightly darker than holotype. Total length, 2.40 mm; greatest width, 1.80 mm; width at base of pronotum, 1.55 mm; width at apex of pronotum, 1.02 mm; length of pronotum at midline, 0.69 mm; length from base of prosternal process to tip of coxal lamina, 1.10 mm; width between eyes, 0.69 mm.

VARIATION: The series before me varies slightly in color some specimens being darker and presumably more fully hardened than others. A series from Lanier County, Georgia, are particularly darker below than those from central Florida.

TYPE LOCALITY: Holotype and allotype: FLORIDA: Alachua County, Payne Prairie south of Gainesville, vii.23.1960, F. N. Young (in UMMZ). Paratypes, to be distributed to other museums: 8, same data as types; 27, same locality, viii.21-22, 1961. Alachua Co., San Felasco Hammock west of Gainesville, 2, x.5.1948; 1, ix.13.1950. Alachua Co., Lake Newnan east of Gainesville, 1, ix.27.1939. Gadsden Co., Chattahoochee, 2, vi.13.1954. Jackson Co., Cypress pond east of Marianna, 2, vi.14.1954. GEORGIA: Lanier Co., Pond south of Raysville, 15, vii.13.1960. All collected by F. N. Young.

The two species described above will run in my key (Young 1956) to couplet four but are immediately distinguishable from *dauidis* J. Balfour-Browne by size, body form, elytral punctation, and genitalia and from *pustulatus* by the genitalia and characters given under the diagnoses.

I wish to express my thanks to Mr. J. Balfour-Browne and other members of the staff of the British Museum (Natural History) for their assistance and tolerance during my studies of the types of American aquatic beetles in that institution.

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